

APPLICANT(S): LI, Yingxue et al.
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AMENDMENTS TO THE CLAIMS

Please add or amend the claims to read as follows, and cancel without prejudice or disclaimer to resubmission in a divisional or continuation application claims indicated as cancelled:

1. (Currently Amended) A method for communicating a signal, comprising:
establishing one or more quality indicators at a first communication device, the first communication device comprising a plurality of antenna elements, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices;
determining a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband;
modulating at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and
sending the plurality of signals from the plurality of antenna elements to yield a transmitted signal,
wherein establishing the one or more quality indicators at the first communication device further comprises receiving one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators, and
wherein determining the modification according to the one or more quality indicators further comprises:
adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-control bit at a first time period corresponds to a second bit value for a power-control bit at a second time period; and
adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value.

2. (Currently Amended) The method of Claim 1, wherein establishing the one or more quality indicators at the first communication device further comprises:

~~receiving at the first communication device one or more quality indication signals; and~~

establishing the one or more quality indicators according to the one or more quality indication signals.

3. (Original) The method of Claim 1, wherein establishing the one or more quality indicators at the first communication device further comprises:

detecting the quality of the communication link; and

calculating the one or more quality indicators according to the quality.

4. (Original) The method of Claim 1, wherein at least one of the one or more second communication devices comprises a plurality of second antenna elements.

5. (Original) The method of Claim 1, wherein at least one of the one or more communication links is configured according to a Multiple-Input-Multiple-Output (MIMO) communications protocol.

6. (Original) The method of Claim 1, wherein the one or more communication links are configured according to at least one of a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol.

7. (Original) The method of Claim 1, wherein the modification is associated with an improvement of the transmitted signal, the improvement comprising at least one of the following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced network load, and reduced RF interference.

8. (Original) The method of Claim 1, wherein the modification describes the at least one adjustment of the one or more modulation features for a signal of the subset of signals.

9. (Original) The method of Claim 1, wherein the plurality of modulation features comprise a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element.

10. (Original) The method of Claim 1, wherein determining the modification according to the one or more quality indicators further comprises:
adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained, adjusting the second set while maintaining the first set, and adjusting the first set while maintaining the second set until a second steady state is obtained.

11. (Canceled)

12. (Original) The method of Claim 1, wherein:
the first communication device comprises a subscriber communication device; and
the one or more second communication devices comprise one or more base stations.

13. (Original) The method of Claim 1, wherein:
the first communication device comprises a base station; and
the one or more second communication devices comprise one or more subscriber communication devices.

14. (Original) The method of Claim 1, wherein:
the first communication device comprises a first base station; and the one or more second communication devices comprise one or more second base stations.

15. (Original) The method of Claim 1, wherein:

the first communication device comprises a first subscriber communication device; and

the one or more second communication devices comprise one or more second subscriber communication devices.

16. (Currently Amended) A system for communicating a signal, comprising:

a first communication device operable to establish one or more quality indicators, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices, the first communication device comprising:

a plurality of antenna elements; and

a signal modifier operable to:

determine a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband;

modulate at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and

send the plurality of signals to the plurality of antenna elements to yield a transmitted signal,

wherein the first communication device is operable to establish the one or more quality indicators at the first communication device by receiving one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators, and

wherein the signal modifier is operable to determine the modification according to the one or more quality indicators by:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-

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control bit at a first time period corresponds to a second bit value for a power-control bit at a second time period; and
adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value.

17. (Currently Amended) The system of Claim 16, the first communication device further operable to establish the one or more quality indicators by:

~~receiving at the first communication device one or more quality indication signals; and~~

establishing the one or more quality indicators according to the one or more quality indication signals.

18. (Original) The system of Claim 16, further comprising a quality indicator generator operable to establish the one or more quality indicators at the first communication device by:

detecting the quality of the communication link; and

calculating the one or more quality indicators according to the quality.

19. (Original) The system of Claim 16, wherein at least one of the one or more second communication devices comprises a plurality of second antenna elements.

20. (Original) The system of Claim 16, wherein at least one of the one or more communication links is configured according to a Multiple-Input-Multiple-Output (MIMO) communications protocol.

21. (Original) The system of Claim 16, wherein the one or more communication links are configured according to at least one of a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol.

22. (Original) The system of Claim 16, wherein the modification is associated with an improvement of the transmitted signal, the improvement comprising at least one of the

following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced network load, and reduced RF interference.

23. (Original) The system of Claim 16, wherein the modification describes the at least one adjustment of the one or more modulation features for a signal of the subset of signals.

24. (Original) The system of Claim 16, wherein the plurality of modulation features comprise a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element.

25. (Original) The system of Claim 16, the signal modifier operable to determine the modification according to the one or more quality indicators by:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained;
adjusting the second set while maintaining the first set; and
adjusting the first set while maintaining the second set until a second steady state is obtained.

26. (Canceled)

27. (Original) The system of Claim 16, wherein:
the first communication device comprises a subscriber communication device; and
the one or more second communication devices comprise one or more base stations.

28. (Original) The system of Claim 16, wherein:
the first communication device comprises a base station; and
the one or more second communication devices comprise one or more subscriber communication devices.

29. (Original) The system of Claim 16, wherein:
the first communication device comprises a first base station; and
the one or more second communication devices comprise one or more second base stations.
30. (Original) The system of Claim 16, wherein:
the first communication device comprises a first subscriber communication device; and
the one or more second communication devices comprise one or more second subscriber communication devices.
31. (Currently Amended) Logic for communicating a signal, the logic embodied in a medium and operable to:
establish one or more quality indicators at a first communication device, the first communication device comprising a plurality of antenna elements, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices;
determine a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband;
modulate at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and
send the plurality of signals from the plurality of antenna elements to yield a transmitted signal,
wherein said logic is operable to:
establish the one or more quality indicators at the first communication device by receiving one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators;
determine the modification according to the one or more quality indicators
by:

adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-control bit at a first time period corresponds to a second bit value for a power-control bit at a second time period; and
adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value.

32. (Currently Amended) The logic of Claim 31, operable to establish the one or more quality indicators at the first communication device by:

~~receiving at the first communication device one or more quality indication signals; and~~

establishing the one or more quality indicators according to the one or more quality indication signals.

33. (Original) The logic of Claim 31, operable to establish the one or more quality indicators at the first communication device by:

detecting the quality of the communication link; and

calculating the one or more quality indicators according to the quality.

34. (Original) The logic of Claim 31, wherein at least one of the one or more second communication devices comprises a plurality of second antenna elements.

35. (Original) The logic of Claim 31, wherein at least one of the one or more communication links is configured according to a Multiple-Input-Multiple-Output (MIMO) communications protocol.

36. (Original) The logic of Claim 31, wherein the one or more communication links are configured according to at least one of a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol.

37. (Original) The logic of Claim 31, wherein the modification is associated with an improvement of the transmitted signal, the improvement comprising at least one of the following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced network load, and reduced RF interference.

38. (Original) The logic of Claim 31, wherein the modification describes the at least one adjustment of the one or more modulation features for a signal of the subset of signals.

39. (Original) The logic of Claim 31, wherein the plurality of modulation features comprise a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element.

40. (Original) The logic of Claim 31, operable to:
determine the modification according to the one or more quality indicators by:
adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained;
adjusting the second set while maintaining the first set; and
adjusting the first set while maintaining the second set until a second steady state is obtained.

41. (Canceled)

42. (Original) The logic of Claim 31, wherein:
the first communication device comprises a subscriber communication device; and
the one or more second communication devices comprise one or more base stations.

43. (Original) The logic of Claim 31, wherein:
the first communication device comprises a base station; and

the one or more second communication devices comprise one or more subscriber communication devices.

44. (Original) The logic of Claim 31, wherein:
the first communication device comprises a first base station; and
the one or more second communication devices comprise one or more second base stations.
45. (Original) The logic of Claim 31, wherein:
the first communication device comprises a first subscriber communication device; and
the one or more second communication devices comprise one or more second subscriber communication devices.
46. (Cancelled)
47. (Original) A method for communicating a signal, comprising:
establishing one or more quality indicators at a first communication device, the first communication device comprising a plurality of antenna elements, the one or more quality indicators indicating a quality of one or more communication links between the first communication device and one or more second communication devices, at least one of the one or more communication links configured according to at least one of a Multiple-Input-Multiple-Output (MIMO) communications protocol, a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol, at least one of the one or more second communication devices comprising a plurality of second antenna elements, the first communication device comprising at least one of a first subscriber communication device and a first base station, the one or more second communication devices comprising at least one of a second subscriber communication device and a second base station, the one or more quality

indicators established at the first communication device by performing at least one of the following:

- receiving at the first communication device one or more quality indication signals comprising a plurality of power control groups corresponding to the one or more quality indicators, and establishing the one or more quality indicators according to the one or more quality indication signals; and

- detecting the quality of the communication link, and calculating the one or more quality indicators according to the quality;

determining a modification according to the one or more quality indicators, the modification describing at least one adjustment of one or more modulation features of a plurality of modulation features for a frequency subband, the plurality of modulation features comprising a total power of the transmitted signal, a phase rotation associated with an antenna element, a power ratio associated with an antenna element, an amplitude associated with an antenna element, a time delay associated with an antenna element, and a frequency shift associated with an antenna element, the modification associated with an improvement of the transmitted signal, the improvement comprising at least one of the following: reduced medium contention, reduced probability of detection, reduced probability of interception, more balanced network load, and reduced RF interference, the modification describing the at least one adjustment of the one or more modulation features for a signal of the subset of signals, the modification determined according to the one or more quality indicators by performing at least one of the following:

- adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features until a first steady state is obtained, adjusting the second set while maintaining the first set, and adjusting the first set while maintaining the second set until a second steady state is obtained; and

- adjusting a first set of modulation features of the plurality of modulation features while maintaining a second set of modulation features of the plurality of modulation features, if a first bit value for a power-control

bit at a first time period corresponds to a second bit value for a power-control bit at a second time period, and adjusting the second set while maintaining the first set, if the first bit value differs from the second bit value;

modulating at least a subset of a plurality of signals in accordance with the modification, a signal of the plurality of signals associated with an antenna element of the plurality antenna elements, a signal of the plurality of signals having the frequency subband; and

sending the plurality of signals from the plurality of antenna elements to yield a transmitted signal.

48. (New) A method for communicating a signal from a first communication device having first and second antenna elements to a second communication device, comprising:

establishing an initial quality indicator at said first communication device, the initial quality indicator indicating a quality of a communication link between the first communication device and the second communication device based on an initial transmission from the first communication device, wherein signals transmitted on the first and second antenna elements have an initial phase modulation;

establishing an adjusted quality indicator at said first communication device, the adjusted quality indicator indicating a quality of a communication link between the first communication device and said second communication device based on an adjusted transmission from said first communication device, wherein signals transmitted on said first and second antenna elements have an adjusted phase modulation, said adjusted phase modulation comprising phase modulation adjusted from said initial phase modulation in a first direction;

determining a phase modification according to a comparison of the initial quality indicator and the adjusted quality indicator, wherein:

if said adjusted quality indicator demonstrates degradation of quality relative to said initial quality indicator, then said phase modification is in the direction opposite to said first direction, and

if said adjusted quality indicator demonstrates improvement of quality relative to said initial quality indicator, then said phase modification is enhanced in the direction of said first direction; and
modulating phase of a signal on the second antenna relative to a signal on the first antenna in accordance with the phase modification.

49. (New) The method of Claim 48, wherein the communication link is configured according to at least one of a hybrid multiple access protocol, an 802.xx protocol, a Code Division Multiple Access (CDMA) protocol, a Time Division Multiple Access (TDMA) protocol, and a Frequency Division Multiple Access (FDMA) protocol.

50. (New) The method of Claim 48, wherein:
the first communication device comprises a subscriber communication device; and
the second communication device comprises one or more base stations.

51. (New) The method of Claim 48, wherein:
the first communication device comprises a base station; and
the second communication device comprises one or more subscriber communication devices.

52. (New) The method of Claim 48, wherein:
the first communication device comprises a first base station; and
the second communication device comprises one or more second base stations.

53. (New) The method of Claim 48, wherein:
the first communication device comprises a first subscriber communication device; and
the second communication device comprises one or more second subscriber communication devices.

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54. (New) The method of Claim 48, wherein the received power control bits correspond to different modulation parameters of the signal modifier in the first communication device.

55. (New) The method of Claim 54, wherein the different modulation parameters correspond to different phase differences between the signals transmitted by the first communication device.

56. (New) The method of Claim 54, further comprising comparing multiple received power control bits, said power control bits corresponding to respective different modulation parameters of the signal modifier, to determine a next signal modification.